Wisconsin

Wisconsin is actively developing statewide geographic information focusing primarily on land records modernization and land information systems (LIS) implemented at the county level. Direction is provided by the Wisconsin Land Information Board, which is statutorily authorized to implement the Wisconsin Land Information Program. Both were authorized by the legislature in 1989 through Act 31. Funding support was provided in Act 339, adopted in 1990, which provided for an increase in recording fees collected by county register of deeds. It is expected these fees will generate approximately \$4 million in FY 1990 and \$6 million each year thereafter. Of these funds, two-thirds may be retained by counties participating in the program, with the remainder used by the board to support its operations and provide for grants to local governments. The program statutes require participation and cooperation by lead state agencies and the university system.

The program and statutes serve as model legislation for the development of integrated statewide GIS/LIS in a vertical and decentralized fashion. In Wisconsin, efforts and standards are focused on data rather than technology, permitting hardware and software independence for GIS. The program evolved after 25 years of study, with efforts also resulting in the Wisconsin Land Information Association which now has over 550 members. State government efforts include implementation of GIS underway in the Departments of Transportation (DOT) and Natural Resources, among others; and coordination efforts underway with the Wisconsin State Interdepartmental Geographic Data Sharing Workgroup. State agencies are required to participate in the program with the development of LIS plans that will be conducted in coordination with strategic information technology plans. Activities in the DOT and the University of Wisconsin have been recognized internationally and representatives of both entities have been leaders in the evolution and ongoing development of geographic information in Wisconsin.

Origins of State Initiatives

Efforts toward the development of geographic information, land information management and the use of GIS technology have been underway in Wisconsin since the 1960s. For example, in 1967

the Wisconsin Department of Resource Development commissioned a study by the University of Wisconsin-Madison (UW Madison) to make operational recommendations for a state planning information system.

The 1970s realized increased awareness and pursuit of land information and land records modernization activities. The 1971 Biennial Budget authorized a \$200,000 program for grants for land use planning activities with a major emphasis on the development of a land and natural resource information system for the state. In 1971, Governor Patrick Lucey created the Wisconsin Land Use Task Force in order to study long-range land resource issues and policies. This task force proposed the development of a comprehensive land use information system. An initial implementation plan was prepared by the Wisconsin Department of Administration. It was however not implemented, due to changing policy directions at the state and federal levels. It has been suggested by some commentators that the lack of momentum in these early endeavors resulted from a lack of strong professional or political constituencies behind the initiatives. In 1973, legislation created the State Cartographer's Office at UW Madison, with the mission to collect, create and distribute cartographic information, as well as to promote communication among governmental entities at all levels of government.

At the same time these activities were pursued at the state level, UW Madison was increasing its related research and instructional activities. During the 1971-72 academic year, a faculty seminar explored and studied land use policies, planning criteria and processes, data needs, and institutional forms needed to improve resource management and development in Wisconsin. The seminar included the study of issues related to the development of a statewide geo-information system. This seminar and other research stimulated other ventures, including a group of faculty and staff organized as the Critical Resource Information Program investigative team in 1973. An inventory of all environmental research activities within the University of Wisconsin System was conducted. This group considered and recommended alternatives to define, collect and manage information about critical natural resources in Wisconsin. Related research and instructional efforts were also expanded during this time by various departments, including the development of land information technology in a multi-disciplinary fashion along parallel tracks.

Areas of research and instruction included automated mapping technologies; the structure of the Public Land Survey System in relation to modern, multipurpose cadastral and land information systems; remote sensing; and computerization of the legal aspects of property ownership and assessment. The Sea Grant Program at UW Madison also conducted research that sought to determine what land record improvements would

be necessary to properly manage the state's coastal zones.

Geographic information coordination efforts were emerging in state government in the mid-1970s. In 1975 the State Planning Section produced an inventory of available governmental maps and sources of natural resource information which were statewide in their coverages. An ad hoc inter-agency group of state offices met in 1975-76 to serve as a land data collection and exchange medium and technical identification advisory group. The Wisconsin Environmental Policy Act forced a project-by-project environmental impact assessment and land information collection analysis. The Wisconsin Department of Natural Resources (DNR) inventoried land records systems and information relative to publiclymanaged lands. It also conducted a review of its data coordination and data management policies. At the same time, the Department of Revenue considered development of a parcel identification numbering system as part of a larger automation study, with the goal of establishing a methodology to set standards for local tax mapping. In 1977 the Department of Administration established an inter-agency committee to coordinate the purchase of aerial photography that would be multi-purpose and multi-participant.

A significant benchmark study undertaken in the mid-1970s and published in 1978, is entitled Land Records -The Cost to the Citizen to Maintain the Present Land Information Base, a Case Study of Wisconsin. For the first time, there was an empirical understanding of the costs associated with land records and information. Known generically as the Larsen Study, it spurred many further activities and study, and has served as a conceptual framework for later endeavors in Wisconsin. It continues to be referenced because no study of its kind or magnitude regarding statewide expenditures has been conducted in any state.

This work was conducted with a wide range of participants and support, including the Wisconsin Department of Administration, the Resource and Land Investigations Program of the United States Geological Survey (USGS), the Council of State Governments, and UW Madison. Its goals included documenting public dollars being spent on land records and proposing specific actions to address the core of governmental problems with land records. This study identified numerous problems with governmental land record systems. Particularly surprising was the magnitude of public expenditures by governmental units and utilities on land records on a statewide basis. It concluded that approximately \$79 million (or \$17 per capita and \$2.25 per acre) was spent on an annual basis for the collection and maintenance of land records on a statewide basis. Another unexpected finding was that local governmental expenditures on land records, \$41 million, were more than one-half of the total.

The Larsen report examined 19 different types of land record products to help illustrate many of the basic problems with land records collected and maintained in the public sector. One of the most important results of the study was the understanding, qualification, and quantification of the flaws of land information systems (LIS) as they existed at that time. Many of these problems persist today. The study concluded that the most significant difficulties with land records and land information have been institutional in nature; land data collection and aggregation should be decentralized from the lowest possible governmental unit to the highest; standard setting should be at higher government levels; land information should be accessible to both citizens and government; and one entity in each jurisdiction should be responsible for land records management.

Land records modernization and land information activities were also occurring in local governments, regional associations and among professionals working with land information. In 1977 the Wisconsin Society of Land Surveyors proposed to the governor and various public decision makers that land records and information be integrated through a statewide base mapping and ground control program. Another example of a diffused integration activity was the effort of the Southeastern Wisconsin Regional Planning Commission (SEWRPC). SEWRPC began development of digital coverages for soils, land use, land cover and other physical and environmental data across its seven constituent counties, including Milwaukee County. Much of the success in SEWRPC's efforts in data integration work was obtained through accurate base mapping with precise ground control. The City of Milwaukee was one of the first municipalities in the country to develop automated spatial information systems. This project began in the 1970s.

UW Madison continued research into land records modernization and land information system technology late in the 1970s and 1980s. From 1979 through 1982, the university conducted the Westport Project as a land records demonstration project. Participating UW departments included Landscape Architecture, Agricultural Economics, and Civil and Environmental Engineering. In addition, the Wisconsin Departments of Natural Resources and Agriculture, Trade and Consumer Protection, the U.S. Department of Agri-

culture, and the Dane County Regional Planning Commission participated in the project. The project illustrated automated mapping technologies that incorporated multiple sources of land information for rural resource planning. This study also resulted in the development of a model for multi-purpose LIS, and spurred two follow up studies. The Dane County Project was conducted from 1983 to 1987. The "Conservation of Natural Resources through the Sharing of Information Layers" project (CONSOIL) focused on soil erosion planning activities mandated by state and federal law. These projects provided many insights into the social, economic and institutional issues involved in GIS/LIS implementation.

Researchers of these projects worked at the inter-disciplinary level, rather than in a multidisciplinary fashion. Conclusions and concepts gained from these three sequential studies included the following. GIS can potentially break many of the institutional barriers to more effective information management. Both technical and institutional issues must be addressed in order for LIS to be successful. These studies highlighted the great importance of geodetic control to the success of the land records modernization process. Geodetic control was found to be important both for the usefulness and integration of land information. They also concluded that the expense of automating the acquisition of various layers of land information was more cost-effective than many manual methods. Automation of each data theme should be performed at the greatest detail available in order to assure non-degradation of positional and attribute accuracy. Standards must be developed to enable the encoding and exchange of information, including the lineage and methods of data capture and automation. Automated LIS should include layers of information that identify socio-political features as well as the physical features of land. They also concluded that LIS implementation at the local government level is a long-term process with significant investment which could require additional funding from state and federal sources.

Emerging GIS/LIS activities at all levels of government during the early 1980s prompted much interest. In response, the UW Madison Institute for Environmental Studies sponsored an inter-disciplinary seminar in spring of 1984 entitled "Modernizing Land Information Systems in North America." The seminar featured more than 20 speakers from the United States, Canada and West Germany, who provided weekly lectures on a broad range of topics related to GIS/LIS implementation. Over 1,500 students, faculty and non-university professionals attended one or more

of these lectures, stimulating further LIS discussion and interest. At its conclusion, an informal group of about 40 land records professionals began discussing issues identified in the seminar. This group ultimately organized itself into what became known as the "Ad Hoc Consortium for Land Records Modernization in Wisconsin." Its emergence was likely the singularly most important development for land records and land information modernization activities in Wisconsin.

The consortium was the first group in the state organized to educate and influence public decision makers about GIS/LIS. It grew continually and developed its own political influence. Late in 1984, the group presented a detailed proposal to Governor Anthony Earl which recommended the establishment of the Wisconsin Land Records Committee (WLRC). Governor Earl responded to this proposal by including in his 1985-87 biennial budget request an allocation to support a task force to study land records modernization in the state. This budget proposal was approved by the Wisconsin Legislature, and in August 1985, the WLRC was created by Executive Order.

In perhaps the most extensive study effort concerning geographic information conducted by a state so far, WLRC's 12 subcommittees each produced reports.

WLRC was composed of 33 members, and was assisted by an additional 100 individuals working with WLRC and its 12 subcommittees. Representatives to the committee came from the university community, counties, towns, city government, public utilities, private planning and consulting firms, and state and federal agencies. WLRC was chaired by a professor at UW Madison who was assisted by a coordinating staff. WLRC held 20 full-day meetings, and its subcommittees met in aggregate more than 100 times.

WLRC's mandates were to examine and address the immediate needs of state and local agencies regarding land records collection and management; and to develop recommendations on how Wisconsin should approach the long term issues of land records modernization. WLRC also expanded upon the base of knowledge developed in the Larsen Report and other research efforts. In perhaps the most extensive study effort concerning geographic information conducted by a state so far, WLRC's 12 subcommittees each produced reports. The WLRC finalized its summary report on July 1, 1987. The report was en-

Committee: Modernizing Wisconsin's Land Records. Building on the Larsen report, this final report and the subcommittee reports explored a wide range of classified issues including Codes and Statutory Data Requirements, Benefits and Costs, Data Responsibility, Maintenance and Security, Classification and Standards, Inter-Agency and Inter-Governmental Data Processing, Geographic Reference Standards, Emerging Technologies, Capitalization and Financing Data Systems, Institutional Arrangements, Cooperative Arrangements, and Developing Model Requests for Proposals.

WLRC proposed several reasons to support the need to modernize Wisconsin's land records, many of which were similar to the Larsen report. The final report detailed several of these reasons, including extensive duplication of effort, differing formats resulting in inability to integrate information; a lack of guidelines; costly expenditures; potential economic development applications; support for fair and efficient taxation; enhanced resource management; uncoordinated technology adoption; and increasingly complex institutional and legal conditions, particularly with expanded mandates. It concluded that institutional obstacles remained as the principal hindrance to effective and efficient LIS.

After two years of investigation, WLRC recommended the establishment of the Wisconsin Land Information Program in a "5-point plan." The report represented the continuing evolution of the conceptual model for Wisconsin's efforts in land records modernization. It recommended a board and office be established to develop a local grantsin-aid program, prepare LIS guidelines, find methods to resolve legal and administrative discrepancies pertaining to land information, provide advice to public decision makers, and provide education, research and outreach to promote land records modernization. The office would serve as a statewide clearinghouse for land information, also assessing the potential impact of new technologies on land records modernization. The establishment of County Land Information Units to serve as the primary coordinating entity within these jurisdictions and the contact point between local government and the Office of Land Information was an important component of the plan. The report also suggested the creation of a Land Information Coalition to provide education, influence and advocacy for land records modernization in Wisconsin.

While this study was being finalized, the Ad Hoc Consortium that proposed the WLRC study was gaining in size and momentum, gaining some political influence. The establishment of a land

records modernization agenda was accomplished, providing a forum for education and discussion. Consortium members and the WLRC began to arrange a land information organization under the auspices of a state chapter of the Urban and Regional Information Systems Association with the cooperation of other groups, including AM/ FM International and the American Congress on Surveying and Mapping. In 1987, the Wisconsin Land Information Association (WLIA) was formed. Its initial membership included over 100 professionals from government and the private sector. WLIA's overall goal was defined as one in which it would assist in the modernization of the state's land records by developing a statewide LIS network. Four major WLIA objectives included policy development and political action, networking, technical evolution, and education. Since the 1980s WLIA has made a substantial amount of progress toward these goals and objectives, including conferences and development of the Land Information Program Statutes; and more recently, the implementation of its directives.

During the 1980s, state agencies were beginning to implement GIS in-house in addition to the statewide efforts. While efforts were underway in the Department of Natural Resources in the 1980s, a major effort was undertaken in the Department of Transportation (WisDOT) beginning in 1986. This project had strong support from WisDOT leadership including the agency secretary and the director of the Division of Business Management. The division director also helped lead the development of WLIA, modeling it after the American Association of State Highway and Transportation Officials (ASHTO). ASHTO uses a consensus approach among states to voluntarily develop activities and develop standards.

The Wisconsin State Interdepartmental Geographic Data Sharing Workgroup was also initiated, and has met on a monthly basis since 1986. These representatives of state agencies adopted the mission to discuss, produce, implement and promote technical solutions for the processing of digital geographic information, thereby enhancing the delivery of government services to Wisconsin citizens.

The Wisconsin Land Information Program and the Wisconsin Land Information Board were created as part of the 1989 Biennial Budget Bill, known as Act 31. The act provided for a small amount of general purpose revenue funding to support the program, including one staff position, while a permanent funding source was sought. One duty of the board defined in the statute was to "identify and study possible program revenue sources or other revenue sources for the purpose of funding the operations of the board including

grants to counties" (see Coordination Efforts, Groups and Activities for details regarding Act 31).

Wisconsin's focus is unique among the states because statewide geographic information coordination efforts have primarily focused on improved large scale data.

Members of the board, which included representatives of state and local agencies, were appointed and the first meeting was held on December 7, 1989. The board's immediate concern involved developing program funding in order to provide for program implementation.

Coordination Efforts, Groups and Activities

Wisconsin's focus is unique among the states because statewide geographic information coordination efforts have primarily focused on improved large scale data. This approach seeks to actively develop integrated land information systems (LIS) and modernization of land records in a decentralized fashion from the "bottom up;" i.e., from minor civil divisions to counties to state and federal levels, in a manner that enables aggregation and integration on a statewide basis. Wisconsin has embarked on a statewide, county-based geographic information coordinating effort through the Land Information Program, established by the legislature in 1989. The program is led by the Wisconsin Land Information Board, also established by statute, and facilitated by the Wisconsin Land Information Association (see below).

Information technology direction and activities within state government are led by the Interim Board on Information Technology (IBIT), created by the Governor in June, 1991. IBIT, composed of five state agency officials and five private sector professionals, is staffed by the Department of Administration's Bureau of Information and Telecommunications Management. An Information Technology Strategic Planning Initiative (IT-SPI) was undertaken in 1989 and 1990 under the guidance of the former Information Technology Advisory Board. This board concluded that coordination of GIS among state agencies was an important direction, but neither board has taken action regarding GIS. Interagency GIS coordination is facilitated by the Wisconsin State Interdepartmental Geographic Data Sharing Workgroup, established in 1986 (see below). The Wisconsin Land Information Board also facilitates interagency efforts through its statutory authority and the state agency integration planning process.

Studies conducted by Wisconsin in regard to geographic information, specifically land records and LIS, are among the most comprehensive ever conducted in the states.

Wisconsin Land Information Program

Act 31, adopted by the legislature in 1989, established the Wisconsin Land Information Program. Funding for the program was established by the legislature in 1990 through Act 339, and includes increases in the first page recording fees for real estate transactions. It is expected this program will generate approximately \$4 million in FY 1990 and \$6 million dollars each year thereafter. Additional provisions were adopted in 1991 to eliminate matching requirements for counties to participate in the program.

Definitions were established by Act 31. Land information was defined inclusively as "... [any] physical, legal, economic or environmental information or characteristics concerning land, water, groundwater, subsurface resources or air in this state." Examples include information relating to "topography, soil, soil erosion, geology, minerals, vegetation, land cover, wildlife, associated natural resources, land ownership, land use, land use controls and restrictions, jurisdictional boundaries, tax assessment, land value, land survey records and references, geodetic control networks, aerial photographs, maps, planimetric data, remote sensing data, historic and prehistoric sites and economic projections." Land information systems (LIS) were defined as the orderly method of organizing and managing land information and land records. Records were defined as maps, documents, computer files and any other information storage medium in which land information is recorded. "Land Information" is the particular characteristic concerning land that is described and/or displayed. "Land Records" are simply the medium in which land information is stored. In turn, "LIS" are the means by which land information and records are organized and managed in an orderly fashion.

The governmental effort toward land records

modernization and LIS leading to the program transcended three gubernatorial administrations in Wisconsin, including administrations of both major political parties. The program evolved from 25 years of collaborative study, analysis and effort by representatives of state government, the University of Wisconsin, local governments, federal agencies and the private sector (see Origins of State Initiatives). The research and study culminated in the work of the Wisconsin Land Records Committee (WLRC), created by Executive Order in 1985. WLRC, charged to examine conditions and make recommendations, conducted extensive work with volunteer efforts of over 100 participants. It analyzed conditions and recommended changes to improve land records and LIS, including development of a model and policies that served as the basis for the program approved by the legislature.

Studies conducted by Wisconsin in regard to geographic information, specifically land records and LIS, are among the most comprehensive ever conducted in the states. They determined that current land records are generated and maintained independently, often in incompatible formats, at all levels of government and the private sector. In Wisconsin, more than 600 statutes and administrative rules contain references to land information collection, maintenance and use. At least 2,592 units of government have land records responsibility. There are records and information on more than 2 million parcels of land. Currently it costs more than \$140 million every year to maintain these records by the public sector and utilities, not including other private sector expenditures. Most records are kept in manual formats and are otherwise difficult to access. Much of the information collected by all governments is redundant, but cannot be shared because it is kept at different scales, forms or formats. These redundant efforts are very inefficient and they increase handling and processing costs for government, the private sector and taxpayers.

Program Principles and Policy Objectives

The program was established to develop statewide LIS that are integrated, both vertically and horizontally. Rather than a single, centralized LIS, the goal is a decentralized confederation of systems where those with existing land records responsibilities would continue to collect, maintain and keep custody of land information. Through integration, this confederation of systems will be tied by formal and informal data sharing arrangements.

Two major policy objectives are modernization and integration, particularly "Land Records Modernization." Though the statutes do not provide an exact definition for land records modern-

ization, the board has defined it as the undertaking and process by which land information can ultimately be shared and integrated through the implementation of automated LIS. Clarifying the definition of land records modernization is the core of the program's overt policy objective, i.e., the organization and orchestration of land information in a way that yields greater utility and usefulness across jurisdictions and the private sector. Modernization enhances the capture of technology to invigorate and update land information, land records and LIS. Land records modernization serves as the script for program participants.

The concept of "integration" is one where information that is developed by one department or jurisdiction can ultimately be shared with other departments and jurisdictions at every level of government, utilities, and the private sector. The program's funding mechanism is designed to create an incentive to encourage integration and modernization.

Integration and modernization are also devices used to update and revitalize public and private expenditures in land records management and LIS. Similarly, integration and modernization provide greater utility and productivity in these ongoing investments. These benefits derive from reduction of duplication and increased efficiency and effectiveness in the performance of ongoing operations. A third significant benefit, though somewhat less quantifiable, is increased utility resulting from expanded capabilities.

Act 339 specifically directed that program revenue be used for "Systems Integration," which was defined as "... the coordination of land records modernization at all levels of government to ensure that the information can be shared, distributed and used by all participants, including state and local government, the private sector and taxpayers. This concept also includes the ability to assist governments to coordinate activities to reduce redundant activities, and enable information to be shared by governmental units, citizens, and the private sector with compatible and standardized formats for exchange.

The statutory mandate for integration is reinforced by the requirement of state agencies to file plans to integrate land information to enable such information to be readily translatable, retrievable and geographically referenced for use by any state, local governmental unit or utility. The spirit of this section also embraces integration and data sharing within the private sector. The concept for integration is not limited to state government. Counties participating in the program must submit a "County-Wide" plan for land records modernization and establish a land information office to coordinate land information projects within the

county; between the county and local governmental units; between the state and local governmental units; and among local governmental units, the federal government and the private sector.

Principles for land records modernization were adopted by the Land Information Board to serve as the framework for meeting program objectives at all levels of government. These principles are used as reference for board decision making. It is envisioned and intended that LIS developed through the program will be:

 Multi-Participant and Multi-Purpose. This will be accomplished through the creation of a land information network consisting of a confederation of independent, automated, information systems operating at all levels of government and in the private sector. Land information of known quality will be transferred between systems using standardized methods and protocols.

 Focused on Information. A primary objective of the program is that it be "data-driven," focusing technical specifications on data, rather

than technology.

- Independent of Specific Technology. Hardware and software independence is a key principle, with the confederation of independently held databases residing on a variety of computer hardware and software configurations. The technical details of the computing environment are not an emphasis; for example, there is no requirement that qualification for an approved County-Wide Plan is dependent upon the purchase and adoption of any specific technology or computer system.
- Evolutionary. Program accomplishment in an evolutionary fashion will preserve investments in existing land records modernization programs and provides a framework and direction for future programs.
- Encompasses Many Types of Land Information Activities. Land information, as defined by Act 31, encompasses most of the data collected and used by public agencies. To simplify standards development and set modernization activity priorities, the board has defined the following ten unprioritized 'Land Information Activities', including, but not limited to: Agricultural Planning And Management, Forest Management, Geodetic Reference Framework and Base and Image Mapping, Historical and Archaeological Management, Infrastructure And Facility Management, Land Records Management, Land Use Planning and Zoning Administration, Natural Resource Planning And Management, Public Administration And Planning, and Real Estate Taxation Management.
- Geographically Based. The location of all spatial data shall be described in such a way as

to establish its true position on the surface of the earth within some known degree of confidence. This means that all coordinate values must relate to real world or geographic locations and not map locations. Any spatial data that is generated should state and document the level of accuracy.

• Reliant Upon Public-to-Public and Public-to-Private Partnerships. These partnerships are an integral part of modern LIS. State and local governments are encouraged to establish formal and ad hoc relationships among their own departments and with other governmental entities such as cities, villages, towns, regional planning commissions, special purpose districts, and state and federal agencies. The private sector, particularly utilities, are important participants and should be included in this process.

• Based on Democratic Principles. Programs established in support of land records modernization shall be based on democratic principles consistent with the tradition of good government in Wisconsin. Particular attention is paid to open, public access to information; governmental responsiveness to the public; equitable treatment of all individuals; and protection of an individuals's right to privacy.

Coordination Groups

The Wisconsin Land Information Board was created by Act 31 in 1989, following extensive efforts to craft and adopt this legislation (see Origins of State Initiatives). Roles and responsibilities of the board to direct and implement the Land Information Program are defined in the act, including the requirement that it become the focal point for knowledge about land information in the state. The board has direct control over the expenditure of funds derived from the Land Information Program, also created by statute, regardless of whether those funds are directly retained or come in the form of a grant. It was the intention of legislators sponsoring Act 339, which authorized this funding, that the board maintain control over all program revenue as a means to achieve the legislative intent of land information integration.

According to Act 31, the board includes the secretaries or representatives of the departments of Administration, Agriculture, Trade and Consumer Protection, Natural Resources and Transportation. State government is also represented by the State Cartographer. Four local representatives appointed by the Wisconsin Governor are from county and municipal government selected from various geographical regions of the state; including at least one member of a county board of supervisors, at least one member of a city council or village board, and at least one person who is a county officer active in land information

management, and each to serve six-year terms. Four representatives are from public utilities and private businesses from various geographical regions of the state, including at least one public utility representative and at least one representative of a professional land information organization. These members also serve six-year terms on the board, and are appointed by the Governor. All gubernatorial appointments are subject to the advice and consent of the Senate.

The statutes also define specific advisory members, including the state historic preservation officer, the secretary of revenue, the state geologist, or their designees, a representative of a regional planning commission selected by the board, a county employee active in land management who is selected by the board, and representatives of state and federal agencies active in land information management.

In all, the board has invited 14 people as nonvoting advisory members. The non-voting advisory members represent federal agencies including the U.S. Geological Survey, the Bureau of Land Management, the National Park Service, the U.S. Forest Service, the U.S. Environmental Protection Agency, the U.S. Army Corps of Engineers, the National Geodetic Survey, and the U.S. Soil Conservation Service. Other non-voting members include representatives of the Southeastern Wisconsin Regional Planning Commission, the Wisconsin Counties Association, and the Marathon County City-County Data Center Commission. The board elects its officers, and is currently chaired by a representative of Wisconsin Power and Light.

Committees have been established to meet board-specified missions. Board and committee members devote extensive time to meet program objectives, including many educational efforts, particularly among local governments. Staffing is provided by a full-time executive director, and by the equivalent of 1.5 additional staff workers as approved by Act 339 in 1990.

The act provides that the board be responsible for coordinating and facilitating development of LIS throughout the state. Governor Tommy Thompson's veto message in response to the creation of the Land Information Board defined the board's overall responsibility. It stated that "the Board is empowered to coordinate Wisconsin's efforts to modernize its land records". More specifically, duties include directing and supervising the land information program and serving as the state clearinghouse for inventory, access and distribution of state and local land information. The board is directed to provide technical assistance and advice to state agencies and local governmental units with land information responsibilities;

prepare guidelines to coordinate the modernization of land records and LIS; review for approval county-wide plans for land records modernization; and review and approve project applications for grants-in-aid to local government. The inventory process and the provision of technical assistance are powerful implements to achieve integration. In doing so, the board will be aware of the status of land records and can better fashion systems, standards and devices to coordinate integration and modernization in order to meet the needs revealed by the inventorying process.

Though it has extensive statutory authority, the board is constrained in that the program is voluntary for local government. As a result, the board must rely on making incentives to county governments for participation, because it has not been vested with rule-making authority. Within the context of these incentives, the board has very specific authority and is ensuring that LIS are integrated throughout participating counties by preparing standards and guidelines. The statutory duties to review and approve grant applications and countywide plans provide the means to direct the implementation of standards and guidelines to achieve systems integration.

The board's statutory tasks go beyond the implementation of the program. According to Act 31, it is required to identify and study possible program or other revenue sources for funding board operations, including grants. In response to this mandate, the board proposed the funding legislation embodied in Act 339. The Wisconsin Land Information Association (WLIA) had prepared and proposed a funding mechanism for program operations, including an increase of fees collected at registers of deeds offices at the county level. This funding proposal changed the model developed by the Wisconsin Land Records Committee in its 1987 report, which recommended a grants program only. WLIA suggested that any funding include both grants for local units of government and fees retained directly by participating counties. This proposal, with some changes, was passed by the legislature and signed into law by Governor Thompson as Act 339 in 1990. The statutory mandate for funding mechanisms is ongoing and the board must continue to study and identify possible revenue sources to fund this program.

The board is not limited to traditional funding alternatives in this pursuit. For example, the board may try to persuade vendors to offer discounts to local governments. Given the potential cost of this program, over time, the cultivation of other funding sources is an important function of the

board. As part of this effort, the board is working to encourage economic development through its activities.

Program Activities

The Land Information Program statutes define five separate components of the board's duties, including:

- County-wide Plans for Land Records Modernization
 - State Agency Integration
- State Clearinghouse for Land Information and Land Information Systems
 - Grants-in-Aid to Local Government
- Provide Technical Assistance to State and Local Government

Clearinghouse efforts are underway, including the development of a pilot project using GIS technology. A board committee chaired by the State Cartographer has been charged with the development of a model for data structure, organization, collection and custodianship. The inventories prepared under the State Agency Integration Planning process have provided initial catalogs of land information and systems, but to date only at the state agency level.

State agency integration requirements include that all state agencies are obligated to cooperate with the board in the coordination of land information, and that selected state agencies must prepare and place on file with the board "State Agency Integration Plans" on a biennial basis beginning in March, 1990. These agencies include the following departments: Administration, Agriculture, Trade and Consumer Protection, Development, Health and Social Services, Industry Labor and Human Relations, Natural Resources, Revenue, and Transportation. Other agencies involved include the Board of Regents of the University of Wisconsin System, the Public Service Commission and the Board of Curators of the Historical Society. The purpose of these plans was defined "to integrate land information to enable such information to be readily translated, retrievable, and geographically referenced for use by any state, local government unit or public utility."

Because the program had just been launched and since the board was focusing on the development of 1990 funding legislation, a modified approach to the state agency integration process was taken. The first plan required only an inventory of land information and LIS. Most of the agencies responded in a timely fashion; however, there was a variety of quality and completeness in these inventories. Efforts are underway to update the inventories and to prepare for 1992 integration planning. This process has positive impacts, including encouraging agencies to examine the

products and services it provides in a broad context. This planning process also assists the board in carrying out its clearinghouse function. It is anticipated that these agency plans will be coordinated with the development of strategic information technology plans required of selected pilot agencies by the Bureau of Information and Telecommunications Management (BITM) (see GIS in State Government, BITM).

In addition, Act 31 directed that specified state agencies develop certain data and activities in coordination with the board. Accordingly, the Department of Natural Resources (DNR) is required to conduct a natural heritage inventory and wetlands mapping project with the board. The Department of Agriculture, Trade and Consumer Protection must develop a systematic method of collecting and organizing data related to soil erosion. According to a statute adopted in 1973, the Board of Regents for the University of Wisconsin System appoints the State Cartographer. In choosing the State Cartographer, the Board of Regents must seek the advice of the Land Information Board. The State Cartographer is required to work in coordination and consultation with the board in carrying out all of that office's statutory duties, especially since there is a significant amount of overlap between the mission of the board and that of the State Cartographer. Given the nature of the responsibilities of the State Cartographer and the board, the mandates of the cartographer are considered a subset of those of the board.

Provision of technical assistance to state agencies and local governments has been a key effort in the early and continuing implementation of the program. The board has provided a substantial amount of guidance and education, including over 60 presentations in 1990. Numerous associations such as the Wisconsin Land Information Association, the Wisconsin Register of Deeds Association, the Wisconsin Real Property Listers Association, the Wisconsin Treasurers Association, and the Wisconsin Society of Land Surveyors have sponsored educational meetings. Some groups, such as the Golden Sands Resource and Conservation Development Council, the River Country Resource and Conservation Development Council, and various regional planning commissions, have sponsored day-long seminars on the program. The success of these collective efforts can be seen in the increased awareness and understanding of the issues of LIS implementation across the state.

Other Coordination Groups

Within state government, the Wisconsin State Interdepartmental Geographic Data Sharing Workgroup has met on a monthly basis since 1986. Its participating agencies include represenResources, Transportation, Agriculture, and Revenue; as well as the Geological and Natural History Survey and the State Cartographer's Office. Any government staff person may become a member of the workgroup. There are two types of members: active and informed. Active members attend and participate in workgroup meetings and projects, share information, receive meeting minutes, and have access to compiled documents. Informed members receive meeting minutes and have access to any compiled documents. The workgroup is currently chaired by a staff member of the Geological and Natural History Survey.

The workgroup's mission is to discuss, produce, implement and promote technical solutions for the processing of digital geographic information, thereby enhancing the delivery of government services to the citizens of Wisconsin. The workgroup solves day-to-day, operational problems with regard to digital geographic data. Solvable topics are chosen and result in a working method or structure for implementation. These topics include collection, storage, process, display and exchange of digital geographic data. Although the workgroup primarily focuses on state level operational needs, most of the issues and the working methods can benefit other levels of government as well. The workgroup also discusses current geographic data activities and events. This provides a mechanism to keep the group informed of geoprocessing activity at the state government and other levels.

The workgroup meets on a monthly basis and operates by using a predetermined agenda. The meeting content is designed to accommodate all levels of technical expertise in geoprocessing. The meetings are educational and focus on theory and practice of geoprocessing at the technical level. Four functions are found in each meeting agenda:

- Project Progress Reports. Active members of the workgroup are asked to solve problems by forming a project group of one or more workgroup members. Project groups meet more often than the full workgroup. Representatives of a project group report at each meeting.
- Discussion. A common goal of all workgroup members is to better understand GIS. One or several persons present their experience or share their knowledge on a particular topic that is usually chosen prior to the meeting. Open discussion then addresses questions and concerns. The discussion minutes are compiled, stored and made available to workgroup members.
- Informal Data Sharing. The workgroup regularly shares data, data structures, and data processes. The monthly meeting provides a forum

from which data sharing can be facilitated.

• Show and Tell. Each meeting typically includes information on particular geodata bases, progress reports on data conversion efforts, as well as progress reports on current issues and activities in geoprocessing.

The workgroup helps to solve operational problems in a team fashion using the project group system. This allows for a division of responsibility and the utilization of a number of sophisticated technical people to a given problem. This work reduces the work loads of individual members as well as serving to bring a significant amount of expertise to bear on a specific problem. This problem solving methodology demands serious commitment by workgroup members. The workgroup has functioned quite well in this cooperative fashion. The workgroup is evaluating proposed federal standards and has offered assistance to the board, with organization of a Technical Advisory Group to serve in this capacity.

The Wisconsin Land Information Association (WLIA) is a 550-member organization composed of professionals from various disciplines who share a common interest in the modernization of Wisconsin's land records and in LIS. Organized in 1986 as recommended by the Wisconsin Land Records Committee, its members are from all levels of government and academia, including surveyors, title insurers, resource planners, cartographers, attorneys, planners, and others working in land-related fields. It is currently chaired by the GIS Manager of the Wisconsin Department of Transportation. Four standing committees include a steering committee, and ones dedicated to education, communication, and technology.

The overall goal of WLIA is to modernize the state's land records by fostering the development of statewide LIS networks. This vision does not embrace a single system, but rather a series of compatible, interactive, multipurpose systems. WLIA has identified four major objectives to meet this goal:

- 1. Policy Development/Political Action. These endeavors focus on active promotion of land information systems development.
- 2. **Networking**. The intent of this objective is to facilitate interaction among local governments, state agencies, utilities and the private sector.
- 3. Technical Evolution. This objective supports the goals of the WLIA through standards and guideline development and recommendation. This objective also provides a forum to bring technical issues forward for discussion and analysis.
- 4. Education. To meet the WLIA goal, the association must promote the understanding of

land information systems, and the WLIA, its members and activities.

Each of these objectives serve the overall goal of fostering cooperation and coordination. The WLIA has carried forward the "Wisconsin Vision" since its inception in 1986. Its founders led the research, study and analysis in the development and passage of the Land Information Program Statutes. The Association has worked closely with the Wisconsin Land Information Board regarding the many issues involved in the implementation of the program. Its advocacy and education shaped its conceptual framework, and also helped facilitate its placement on the agenda of decision makers in the state legislature and administration. At each step, WLIA has promoted the decentralized, "bottom up", and integrated model of land records modernization.

The Wisconsin Land Information Program has a distinct local government orientation, one which seeks to develop modern, integrated LIS using the "bottom up" approach. Act 339, adopted in 1990, established funding for counties participating in the program.

WLIA has made a substantial amount of progress toward its goals and objectives. It has served as a forum, drafted legislation and sponsored four annual conferences that have attracted capacity crowds each year. Future efforts are to expand upon Wisconsin's land information inventory efforts, and to focus on and survey actual data sharing activities. A primary focus of WLIA involves the development of standards. It is expected that the organization will assume a leadership position in this regard to formulate standards by consensus rather than by directive.

Local Government Program

The Wisconsin Land Information Program has a distinct local government orientation, one which seeks to develop modern, integrated LIS using the "bottom up" approach. In particular, county government serves as the focal point for program operation at the local governmental level. This role is very similar to that of the Land Information Board at the state level. The program provides flexibility and discretion for local governments in developing their own land information programs. For example, a county can determine which land records modernization projects to conduct in its county-wide plan. The board has determined a

list of acceptable undertakings that, prima facie, fit the definition of land records modernization.

Act 339, adopted in 1990, established funding for counties participating in the program. It provided that these counties retain \$2.00 of a \$4.00 increase in the first page recording fee collected at county register of deeds offices during fiscal year 1990, and all of an additional \$2.00 fee collected beginning on July 1, 1991. The act has a sunset clause to cease the collection of these fees as of July 1, 1996. In addition to this funding, grants are available for counties and other local government units from the state portion of the fee.

Within the first few months following the passage of Act 339, 71 of the 72 counties in the state chose to voluntarily participate in the program, with the final county, Vernon, considering participation. Interest and support for the program from local elected officials has been very strong. Support for the program stems from flexibility of program requirements and the benefits for counties, including the most rural ones.

County-wide plans are one of the five key elements of the state program.

Regional planning commissions are important entities in Wisconsin, and some are taking an active role in the program. The Northwestern Regional Planning Commission is developing a template county-wide plan for its 10 constituent counties with the idea of coordinating activities and standards across these counties. The River Country Resource Conservation and Development Council is exploring ways of capturing global positioning control for its 11 counties. The Southeastern Wisconsin Regional Planning Commission (SEWRPC) has pursued common database development for its seven counties. In addition, SEWRPC has developed rigorous standards for mapping and LIS for use by all counties within the region. SEWRPC's leadership in systems and data development has led the way for integrated systems across the most populated counties in the state.

County Land Information Office

The program includes various components, and participating counties must establish a Land Information Office. To do so, however, it must be an act of the county board. The board may establish a county land information office or it may direct that the functions and duties of the land information office be performed by an existing department, board, commission, agency, institution, authority, or office. By formal resolution,

the Wisconsin Land Information Board has required that, under whatever office format, the board must have the name, phone number and address of any contact person who is available. This contact person is to foster internal and external communications.

According to the statute, the duties and functions of a county Land Information Office are significant, including serving as the focal point and coordination of all land information projects within the state. In short, the Land Information Office is empowered to orchestrate land records modernization and land information integration at the local level. These efforts are required to include other local governments within its jurisdiction, as well as utilities and the private sector.

Each office is directed, within two years after its establishment, to develop and receive approval from the state board for a county-wide plan for land records modernization. The office is also directed to review and recommend projects from local governmental units for grants from the statewide program. In this capacity, the Land Information Office is responsible to provide leadership to ensure the coordination of land records modernization. It also holds the power of persuasion, through the incentives it may offer other local units of government in its recommendation function for state grants. Although not explicitly set forth, the county office should monitor program implementation at the local level to ensure that counties and other local units of government comply with the statute. County Registers of Deeds are empowered in the program to ensure and account for the funding collected and transmitted to the board and to participating County Treasurers. Funds are provided if the county office has been established, the county-wide plan has been developed and approved by the state board within two years of the creation of the office, and retained fees are used to develop, implement and maintain the county-wide plan.

County-Wide Land Records Modernization Plan

County-wide plans are one of the five key elements of the state program. According to the statute, qualification of a county for program participation is based, in part, on the County Land Information Office preparing and receiving approval from the board within two years of this "County-Wide Plan for Land Records Modernization." County participation in the program entitles the county to retain a portion of the increased recording fees collected at registers of deeds offices and to be eligible to apply for Grants-In-Aid for any local governmental unit within its boundaries. Participating counties may receive resources, expertise and guidance from the board.

To assist in this effort, in January, 1991 the board developed a document entitled Recommendations and Requirements for County-Wide Plans for Land Records Modernization. This document lays out the criteria by which the board will evaluate each county's plan. It also establishes program standards for data, data interchange and administration. It defines and lists a number of qualifying activities that participating local governments may pursue as part of the program. This document was developed with substantial public comment and insight. Five public hearings were held around the state. In addition, comments were taken from many governments, individuals and major associations. As of October 1991, nine county plans had been approved, while most counties are just beginning the planning process. The recommendations and requirements have been very well received by the counties and by other local units of government.

The planning process was designed to enable counties to develop their own direction and activities based on an individual county's needs, priorities and circumstances. Counties are encouraged to include all entities that have land records responsibilities, both in and outside county government. In evaluating county-wide plans, the board is affording each county the widest possible latitude in its interpretation of land records modernization and the development and implementation of individual plans while balancing state need. Plan requirements focus on statutorily defined county responsibilities. An approved county-wide plan represents an agreement between the county and the board.

The county-wide plan is as well a tool for the county to evaluate, analyze and strategically plan for the improvement of land records, land information and LIS. The complexity and detail of the plan is at the discretion of the county. Upon board approval, each county signs an agreement with the board to implement and enforce the plan as delineated. Minimum plan requirements in order to be approved by the Land Information Board include the following sections:

 Introduction identifying all participants in the process and county office information.

 Current Activities and Inventory of the current status of land records, land information and LIS within the county, including the federal, state and the private sectors. This inventory must include a history of budget expenditures for land records modernization projects during the last three years to satisfy this requirement, with the intent that plans be developed from an informed perspective.

 Goals and Objectives, including those of all participants in the program such as other local governments, utilities and other private sector participants. The central emphasis is on coordination and cooperation within and between local governments and the private sector. The planning horizon for land records modernization must be identified and be at least five years in length.

 Modernization and Implementation Plan, including activities and standards that will be used, in accordance with the statutes. This section details the required focus for the plan. In addition, it identifies the various standards that the board will apply in the evaluation of the plan. This portion is composed of four parts, including Foundational Elements, Data Standards, Data Interchange Standards, and Administrative Standards. Each section defines different components and minimum levels of activity that will result in an approved plan. Foundational elements are geographic frameworks including geodetic reference systems, public land survey system corners, geographic control data, parcels, mapping of wetlands, soils and zoning, institutional arrangements, communications, education and training, and public access arrangements. Data standards are associated with each foundational element; and interchange standards include those that may be formal and informal, including parcel identification numbering systems to enable each parcel to have a unique number. The board adopted mandatory formats in this regard as provided in the Recommendations and Requirements for Countywide Plans for Land Records Modernization, with these other provisions. Administrative standards to be included in the plan are composed of agreements between the county and the state board to effectuate the statutory objectives of the program.

Grants-In-Aid for Local Governmental Units

Another one of the five major elements of the Wisconsin Land Information Program is the statutorily created grants-in-aid program for local governments. The statutes provide that a county board which has established a land information office may apply to the board on behalf of any local government unit located wholly or partially within the county for a grant to design, develop and implement an Integrated LIS, the Preparation of Accurate Parcel Maps Tied to the Public Land Survey System, and the preparation of Planning Maps. Grants may also be used for GIS. An individual grant may not exceed \$100,000. The mechanisms to administer the grant program are under development, and the first grant application period is scheduled for October, 1991. Approximately \$1.5 million is expected to be administered under the grant program. Proposed grants will be evaluated by county offices, which will make recommendations about them before final board action. Similar to the plans, grants

shall be administered as a contract between the grantee and the board. The board has defined eligible grant applicants, procedures and evaluation criteria, and these are described in the report entitled *Procedures, Standards and Criteria for Grants-in-Aid to Local Government*, drafted in June, 1991. The board plans to encourage integration and coordination for multi-jurisdictional projects.

Current Local Government Activities

Many local governmental units in Wisconsin are pursuing data integration and cooperation. For example, Milwaukee County in conjunction with three utilities is preparing a common geographic base map upon which an automated land information system can be built. This effort represents an excellent example of a public/private partnership. Under the cooperative agreement between the county and the utilities, each party will share in the cost of the development of the automated mapping and LIS. Each of the utilities will contribute a total of \$520,000 over a five-year period. The county will contribute \$2.08 million over the same five-year period. Several other counties are embarking on multi-jurisdictional efforts for land records modernization. Brown, Winnebago, Dane, Rock, Waukeshaw, and Oneida Counties have submitted county-wide plans to the board which propose programs that cut across several jurisdictions.

GIS in State Government

GIS activities in Wisconsin's state agencies are primarily located in the Departments of Transportation and Natural Resources. The **Department of Administration** (DOA) supports statewide activities and provides direction regarding information technology, land information management, and GIS, including support of the new Interim Board on Information Technology (IBIT), created by the governor in June 1991, and the Wisconsin Land Information Board (WLIB).

DOA's Division of Finance and Program Management includes the **Bureau of Information and Telecommunications Management** (BITM) which coordinates information technology on a statewide basis. BITM is implementing a statewide strategic information technology planning process as part of business planning, and also is responsible for statewide voice and data communications network management used to support state agencies and university campuses. Agencies have traditionally been required to develop Annual Automation Plans. BITM has authority to approve these plans and has provided delegated review authority to

certain agencies while maintaining a management review process to monitor the exercise of delegated authority.

Based on expressed issues and concerns of the Wisconsin Governor and State Legislature, a study was conducted in 1989 and 1990. The study concluded that improvements were needed to provide better consistency from agency to agency, as well as a focus on information technology architecture and statewide implications of initiatives. Recommendations of the report included that a statutory Board on Information Technology be created by a new Division of Information Technology Management in DOA. These recommendations were implemented by the 1991 legislature, and accordingly the governor created IBIT in June 1991. BITM will be implementing recommendations, however, without requested resources. Eight state agencies will be serving as pilot efforts to develop new versions of automation plans linked to business planning efforts. One staff member from BITM will be assigned to each agency. Plans are to include these provision which will be completed in June 1992, along with case studies currently being conducted on topical areas including education distance learning. BITM has not focused efforts on GIS; however, these pilot information technology plans will be coordinated with the land information plans statutorily required of selected state agencies by Act 31. It is expected that agencies will be required to develop one document to meet both requirements.

DOA also is the administrative location of the Wisconsin Land Information Board. According to Act 339, adopted by the legislature in 1990, the board supports the equivalent of 2.5 staff workers. The staff provides administrative support to the board, including drafting many of its documents and coordinating board activities with counties (see Coordination Efforts, Groups and Activities).

In one of its major efforts DOA's staff prepared and administered the Request for Proposals for Geographic and Land Information System Software, (RFP #2519) issued in November, 1990. The purpose of this RFP was to solicit several vendors to list GIS/LIS software, hardware and related products and services on the State Operational Bulletin. Through this RFP, it is envisioned that vendors will be able to market products directly to local units of government and state agencies. This effort is an advantage to local governments in that they can buy directly from the bulletin without having to prepare their own requests for proposals or bids. Proposals submitted under this RFP are being evaluated on the basis of technical merit. Technical, performance, support and cost information will be provided to parties interested in acquiring GIS/LIS technology from the bulletin. In this fashion, local units of government will have complete and accurate information regarding the products and services they may purchase.

The Department of Natural Resources' (DNR) GIS program, first established in the early 1980s, has been gaining momentum over the last several years. GIS are managed by the Geographic Services Section (GEO) of DNR's Bureau of Information Management (BIM), located in the Division of Management Services. GIS are a top BIM priority. GEO provides services for various bureaus. These efforts include applications and database development projects. Currently, the program budget is derived primarily from service charges to users. Projects have been funded by the Bureaus of Water Resources Management (WRM), Air Management (AM), Environmental Analysis and Review (EAR), Forestry (FR), Wildlife Management (WM), and Research (RS).

GEO's current GIS staff is composed of a GIS Program Manager, four GIS Analysts and eight limited-term employees and student interns. Additional technical support is provided by BIM. Three additional permanent program staff will be hired in 1992. When hired, four staff members will be directly funded, and the other four will be funded by fees collected from other bureaus. Current direct expenditures are approximately \$300,000, not including personnel expenditures. Additional funding is provided by other DNR bureaus, via federal funding (primarily from the U.S. Environmental Protection Agency), and from direct funding that supports specific program missions.

The GIS Program has used ARC/INFO software on a MicroVAX II minicomputer and networked personal computers platforms with pcARC/INFO to carry out GIS applications. EPPL7 software is used on these and additional personal computers in DNR. This hardware is being supplemented with multiple workstations.

Major database development has been initiated, and application projects have been conducted with several user groups. GIS databases are being developed at both statewide and regional scales. Conceptually, the DNR GIS database is organized into a series of collections. Each collection supports a level of applications and contains data collected at a range of scales. Informal efforts are underway with other state agencies to develop distributed data custodianship for various data layers. In this effort, DNR would have responsibility for layers which include wetlands, forestry, floodplains, hydrography and others. Funding has not been specifically provided for identified data layers.

DNR GIS Database Levels by Extent, Scale and Resolution

Area/Level	Database Extent	Source Map Scale Range	Resolution
State-wide	State-wide	1:250K to 1:2M	160 Acres
Regional	State-wide	1:24K to 1:250K	10 Acres
Property	DNR Ownership/M	gt. 1:4800 to 1:24K	.5 Acre
Site Specific	Project oriented	1:1200 to 1:4800	.1 Acre

The first major ARC/INFO database developed by the GEO Unit staff was the statewide GIS database. Many of the layers were derived from 1:2 million scale Digital Line Graph (DLG) files produced by the U.S. Geological Survey (USGS) from the National Atlas. Other layers were originally digitized by GEO staff in other GIS formats for the groundwater contamination susceptibility mapping project with U.S. EPA. Conversion to ARC/INFO format was completed in April, 1990.

The regional GIS database project, funded by an EPA grant to support the non-point source pollution program, was a major focus of GEO Unit activities during FY 1991. A number of layers were being processed through this project. The layers and their status are as follows:

Land Net. Most of the state has been converted from USGS 1:100K DLG format to ARC/INFO coverages. Three layers have been produced: Survey township polygons, section polygons, and land net (section) corners. Each of the layers uses the appropriate township/range/section/corner identifiers in a standard format. The raw DLG data for the 100K map sheets covering the rest of the state will be available from USGS in 1991. The remaining DLGs will be converted to ARC covers, edgematched, and will then have standard IDs added. This project was conducted with the Geological and Natural History Survey, which is now responsible for this data layer in the distributed data custodianship effort underway among state agencies.

A separate, but related, project involves processing of the section corner file. The GEO Section is developing a "relational intersection table" which encodes all the relationships between sections and corners depicted at the scale of representation of the source data (1:100,000 scale). This is necessary to support a wide variety of database applications that utilize the Public Land Survey System (PLSS) for location description. One of these applications is a PLSS to Universal Transverse Mercator conversion routine, which supplies an estimated centroid coordinate based on a PLSS description.

Major Public Administrative Boundaries and County Borders. These 1:100,000 USGS DLG datasets have been converted to ARC/INFO

coverages in the areas of Wisconsin wherever data is available. The database includes delineations of federal-and state-owned or administered lands and county boundaries.

Topography. The 1:250,000 Digital Elevation Models (DEM) distributed by the USGS will be

converted to ARC/TIM format.

Land Use/Land Cover. This database was converted statewide from 1:250,000 scale USGS "GIRAS" format to ARC/INFO coverages. There are 21 land cover/use categories with a minimum polygon size (i.e., minimum mapping unit) of 40 acres in general use and 10 acres for water and urban features. Internal sliver polygons have been removed. Future processing will include edgematching of lines between the map sheets and the "clipping" of the data at the state border.

Hydrography. Timing on the translation, editing and attribution of one of DNR's most critical layers, hydrography, is uncertain. U.S. EPA asked DNR to improve upon a version of the 1:100,000 hydrography DLGs. U.S. EPA enhancements include basic edgematching of linework, encoding of river reaches, and addition of waterbody names. U.S. EPA officials will upon completion forward the database to DNR. Upon delivery, additional enhancement will be incorporated by GEO staff. These will include interfacing with standard DNR databases (Master Waterbody File, Surface Water Inventory, etc.), and addition of streams from 1:24,000 maps which are not shown on the 1:100,000 series.

Non-point Source Pollution Watershed Boundaries. This layer has been delineated on 7.5 quadrangle maps by WRM's Non-point Section. GEO Services staff are digitizing this cover statewide. Over one-fourth of the state is complete and the remainder should be completed by early 1992.

Wisconsin Wetlands Inventory (WWI). The WWI was originally digitized with DNR-developed software, and later moved to an IBM mainframe at a state data center. Transfer of this database to the DNR GEO VAX has been completed. The wetlands data at the 1:24,000 scale, derived from 1978-79 aerial photos, are being converted to ARC/INFO format. About 20% of the state has been converted to date, and should be completed by summer, 1992. Each map covers one Public Land Survey township. A hierarchical coding scheme modeled after the U.S. Fish and Wildlife Service scheme is employed to allow general and specific wetland vegetation classification.

Trunk Highway Network and Local Roads. These coverages were originally converted from USGS 1:100,000 transportation DLGs. The Trunk Highway Network cover was converted to ARC/INFO format, updated and structured by the WisDOT GEO Section. The local roads cover

has been converted to ARC/INFO with limited processing. This effort was conducted with the Department of Transportation, which is the custodian for the data.

Other Transportation Networks. This coverage, derived from the 1:100,000 transportation DLG, includes railroads, pipelines, and transmission lines. It will be converted to ARC/INFO format in the near future.

Additional data development efforts have been underway, including those concerned with soils. In this case, some data has been developed and digitized as part of individual projects, and some of the digital data has been developed through the U.S. Soil Conservation Service.

GIS applications projects have been underway within specific bureaus, with assistance from GEO. DNR includes three divisions with GIS activity in addition to the Division of Management Services, where GEO is located. The Division of Environmental Quality includes the majority of GIS efforts, and its Bureau of Water Resources (BWR) has the largest GIS effort in DNR. This bureau is using GIS and working with GEO in conducting the non-point source pollution priority watershed water quality planning project. This effort has been underway since late 1989, and has been funded by both U.S. EPA and state funds. BWR is also conducting some groundwater quality protection efforts using GIS, including displaying tabular data such as for wells. However, the majority of Wisconsin's GIS work for groundwater is being conducted by the Geological and Natural History Survey (see below). BWR has one staff member working full-time on GIS.

The Bureau of Air Quality (BAQ) is using GIS to evaluate sources and amounts of air pollution, including the Lake Michigan Ozone Study. State and U.S. EPA funds have been used in this regard. BAQ is using a personal computer with pcARC/INFO in-house software and has a staff member using GIS. Traffic volume, point sources emissions inventory, and meteorological data are being evaluated within road segments in a five-kilometer grid. Vehicle emissions are being evaluated as well, and data is being included in various models.

Also within the Division of Environmental Quality is the **Bureau of Water Supply**, which also has an in-house personal computer with pcARC/INFO. It is using GIS for contaminant source mapping. The **Bureau of Wastewater Management** will be using GIS in its evaluation of non degradation streams, and will then enter the data within waste load models. The **Bureau of Solid Waste** is considering using GIS for distributors and reprocessors of recycled materials.

The Division of Enforcement's primary GIS activity is contained within the **Bureau of Water Regulation and Zoning**. It is responsible for wetlands delineations, zoning and regulation, as well as shorelands. It has a personal computer with pcARC/INFO, and the equivalent of one staff person using GIS. One of its efforts was the La Crosse River Valley development impact analysis recently completed. Shorelands, wetlands and navigability information is being integrated and analyzed using GIS. The Bureau of Law Enforcement is also beginning to use GIS, for example by analyzing the number of arrests for fishing violations by county.

The Division of Resource Management's primary GIS activity has been in the Bureau of Research, which started these efforts in 1990 with the Glacial Habitat Restoration Area Research GIS Project. It has one staff member dedicated for GIS, and is using pcARC/INFO on a personal computer. More recently, the Bureau of Forestry will be using over \$50,000 from the forestry mill tax to develop digital data for state-owned forests lands at the 1:15,840 scale using SPOT and aerial photography. These efforts are focused on the Northern Highland/American Legion State Forest where data development efforts will begin. Plans are underway that the Bureau of Wildlife Management will be developing a wildlife database using GIS in 1993, with funds made available from fish and game licenses.

The State Cartographer's Office was created by legislative act in 1973, and is one of the few state supported State Cartographers in the nation.

The Wisconsin Geological and Natural History Survey (WGNHS), which is administratively part of the Cooperative Extension program at the University of Wisconsin, began working with GIS in 1987. The survey has the equivalent of two staff members working full-time on GIS. Student interns work on GIS. WGNHS is using pcARC/INFO on five personal computers to support various project needs. Most of its efforts are wholly state funded. Some funding has been provided for soils data development by the U.S. Soil Conservation Service. U.S. EPA funding has been used to support groundwater data development. These efforts focus on well head protection, radon investigations and analysis, and education. The survey's use of GIS also includes projects such as an oil contaminant extenuation model to develop maps, development of water table maps using well records, and the presentation of geophysical gravity information. The survey has a program to assist counties by providing bedrock, glacial and water quantity data. These data are provided in a manual or digital form, for sale or as part of cooperative data development efforts. The survey is the data custodian for the public land survey system data for Wisconsin, and has experienced increasing demand for this data.

The State Cartographer's Office (SCO), also administratively located at the University of Wisconsin, was created by legislative act in 1973, and is one of the few state supported State Cartographers in the nation. The State Cartographer is charged with the mission to collect and distribute cartographic information, to maintain a catalog of current and historic reference and thematic maps, to promote liaison among governmental entities at all levels of government, to keep abreast of progress made by mapping agencies, to publish and distribute special maps and map information, and to assist DNR in its role as the state representative to the U.S. Geographic Names Board. The SCO statutory mission is to foster data sharing, provide liaison services, promote education, and effect improvement and modernization of cartography information. These functions have been carried out in a number of ways by the SCO, including its newsletter, entitled the Wisconsin Mapping Bulletin, and other documents. In addition, the SCO provides educational programs and map publishing and distribution activities.

The **Department of Agriculture**, **Trade and Consumer Protection** initiated work with GIS with a gypsy moth pilot project in 1991. It is purchasing GIS software and a workstation for this project and has designated a GIS coordinator.

The **Department of Revenue**'s (DOR) Bureau of Property Tax began a pilot study to focus on the quantitative/qualititative analytical capabilities of GIS as part of the rural property equalization process. Part of the study is a cost/benefit analysis of using GIS as a work tool in generating rural property equalized values. Beyond the initial pilot project, other equalization in residential and commercial valuation will also be analyzed. The goal of this initiative is to use GIS technology in the DOR as a means to improve staff productivity and work quality. A major emphasis of the pilot project is to enable the DOR to analyze geographic data such as parcels and soil maps in conjunction with non-geographic data, such as land values and taxation rates in an integrated, automated manner.

The pilot project has several objectives. One is to examine and document existing rural property equalization methods and identify potential conversions of manual mapping tasks to GIS solutions. In addition, the project seeks to review and evaluate other governmental and academic research with similar applications for use in the equalization process. A further objective is to identify and research the use of other technologies to enable the DOR to integrate ground cover (raster) images with soils information (vector) and parcel mapping in a cost-effective manner.

At the end of the project, it is anticipated that full GIS capabilities will exist in the Bureau of Property Tax, including the seven regional offices. During the first year, the project will utilize a loaned UNIX-based workstation and ARC/INFO software from the Wisconsin Department of Transportation. In addition, a cooperative effort with the University of Wisconsin will also be continued.

The Wisconsin Department of Transportation (WisDOT) was the first and has the largest GIS in state government. It is actively involved in statewide geographic information coordination efforts and is internationally recognized for its innovation in GIS applications for transportation management. This recognition is the result of Wis-DOT's foresight and careful planning to implement GIS as part of the department's overall information strategy. WisDOT has approached this technology transfer from not only a technical perspective, but also an institutional perspective. It has supported a series of technical, exploratory projects concerning the applicability of GIS technology as a development platform for transportation-related application systems (GIS-T). Beginning in 1986, these projects were designed to introduce GIS concepts and products to the WisDOT community as well as to gain an in-depth understanding of the resources necessary to implement GIS across the department.

GIS activities are located in the Division of Business Management's Bureau of Systems and Data Processing. Five GIS staff members located in the Bureau provide support and training. Wisconsin's State Geodetic Advisor is also located in the Bureau. In addition, four staff positions in the Bureau provide support to the legislature for the redistricting project (see below), an equivalent of five additional persons are working with GIS throughout WisDOT, and other staff members work with CAD.

WisDOT adopted a two-phase effort regarding GIS. Phase I included an evaluation within the state of the practice in GIS-T. Other features of Phase I included the evaluation of the applicability of GIS-T to the specific needs of the department, a feasibility project designed to gain experience with ARC/INFO software, a pilot project for a pavement management GIS application as an ap-

plication development platform, and the acquisition of the initial hardware, software and databases necessary to GIS implementation. During the course of these early investigations, it was recognized that although GIS technology could provide many additional products and services to the department, the widespread application of GIS requires much more institutional support that had been provided in the past.

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Phase II of the GIS development plan is focused on supporting, in both a technical and institutional manner, the objective of providing a single, coherent technology which can be used to integrate, analyze or report on all spatial data collected and maintained by WisDOT. This technology transfer process encompasses, hardware, software, databases, staff, procedures and standards as they relate to geoprocessing requirements of the department. In essence, the thrust of this effort is to use GIS as a core business technology. Achieving this goal requires institutional support, executive support, customer involvement, organizational structure, application development support, training, and education and strategic support. This methodology of implementation is marked by institutional innovation and, as a result, technical innovation.

WisDOT is using 24 Apollo workstations, including one in each of eight district offices; three Intergraph MicroStations; one Apollo Workstation for the Map Data Base and linked to a Optical Disk Player for a Photolog of the State Trunk Highway Network; a 785 VAX Linked to a Wang 7000 personal computer; four plotters; and one Intergraph MicroStation GIS. ARC/INFO software is being used on the workstations.

WisDOT's GIS use 1:100,000 scale USGS DLGs with transportation and hydrology features separated into County Coverages. Also available in digital format are the Official State Highway Map, at approximate scales of 1" = 13 miles and 1" = eight miles; the WisDOT County Map Series; City and Village Maps; and Town Plats. Photolog Ground Based Photography for both directions of state and United States highway

numbered routes and the Interstate System are linked to a GIS workstation. In addition, some large-scale, project-specific topographic mapping and CADD maps are available. Geodetic control data is under development. WisDOT's georeferenced databases include the State Trunk Highway Inventory, Bridge File Inventory, Salt Storage Inventory, and the Pit and Quarry Inventory.

Among the states, Wisconsin's effort is one of the most developed cooperative projects between the legislative and executive branches to support reapportionment efforts with GIS.

The Wisconsin Legislative Information Systems staff is working on the Wisconsin Legislative Redistricting Project (WisRed), which is designed to assist in the process of redistricting in Wisconsin. WisRed was initiated in 1988 following the conclusion that the state was making significant investment in GIS and related data. Among the states, Wisconsin's effort is one of the most developed cooperative projects between the legislative and executive branches to support reapportionment efforts with GIS. GIS technology is a basic tool in WisRed, with plans for GIS to be used for additional purposes in the future. Fifteen staff members are working on the project, including coordinating staff for the legislature, WisDOT staff that developed the redistricting databases, and the Madison Area Computing Center (affiliated with UW Madison), which created a user interface for ARC/INFO for the redistricting project. This project is utilizing seven IBM RISC 6000 workstations with ARC/INFO software. A number of databases have been developed for this process including geographic data derived from the TIGER/Line Census Files. In addition to these databases, the project has developed a number of documents including, Naming Conventions for Files, Coverages and Process, Source Data, Attachment # 1-90CNS Userview Geographic Data Base Design, Data Dictionary, 90CNS Data, and Caveats to the Use of the TIGER 90CNS Data Bases.

Academic Activities

The University of Wisconsin System, particularly at the Madison branch, has been a leader in the conceptual development of land information management and the use of GIS. UW has achieved many accomplishments in research and instruction since the 1960s, which include a wide

range of departments and disciplines within the university. These departments include Civil and Environmental Engineering, Computer Sciences, Engineering Professional Development, Geography, Landscape Architecture, Soil Science, the School of Natural Resources, and the Institute for Environmental Studies. Activities have also been undertaken at several campuses across the state.

Efforts have included helping initiate related statewide efforts resulting in analyses, projects and support, and leading to legislative involvement in the implementation of the Wisconsin Land Information Program (see Coordination Efforts, Groups and Activities). Many persons in the university academic community have participated in providing core research and instructional programs. Continuing education outreach has affected hundreds of people in Wisconsin. These instructional efforts have had the effect of carrying forward the concepts of integration, cooperation and coordination.

In 1991, UW Madison entered into a cooperative agreement with IBM, ERSI and ERDAS for the provision of hardware and software to assist local governments in the modernization of land records. Under this cooperative agreement IBM contributed one A/S 400 computer, five RISC 6000 workstations, five PS/2 personal computers. five RT personal computers, and related software. ESRI contributed ARC/INFO software and ER-DAS provided its image processing software. These systems will be spread across the UW Madison campus and will be used for a wide range of instruction and research applications. This project has been named "LOCALIS." The purpose of the program is to provide research and other applications and deliverables. LOCALIS also includes a consortium of five counties to develop applications and identify needs.

There are dozens of other sites utilizing GIS technology within the UW System. For example, the Geologic and Natural History Department utilizes ARC/INFO for many of its activities. The Computer Graphics and Land Information Facility within the Landscape Architecture Department has undertaken several pilot projects and studies utilizing pcARC/INFO. These GIS stations are also used for instructional efforts.

A campus-wide effort using GIS is underway for improved management of the land holdings and physical facilities of the University of Wisconsin System Board of Regents. Over 17,000 acres and 1,600 buildings are maintained by the UW System Administration Division of Capital Budget and Architectural/Engineering Services for the state's 13 four-year institutions. System Administration includes all deeds, titles, leases, easements and other legal documents for land

holdings. All information regarding each transaction and parcel of land is currently accessible only by reading the historical file. Additionally, System Administration manually maintains land maps for each campus, which serve as the public record of ownership. These maps provide very little other useful information, and are paper records which are difficult to maintain.

UW System Administration is in the process of automating all land records. This will be accomplished in two phases. The first phase is nearing completion, and involves a computerized database of the historical land records. A Real Estate Information System has been designed which will greatly improve access to land information. This automated data will also be used to prepare the annual Land Holding Report that is presented to the Board of Regents. The Land Holding Report presents a summary of all University of Wisconsin System holdings by county, and a report of land transactions which have transpired during the preceding year, including acquisitions and conveyances, acreage and value. The second phase of computerization will involve conversion of property maps to computer format. Both the database and the computerized maps will be made available in digital format via computer disk using a compatible format for sharing land records among state agencies and local units of government.

The completion of the real estate database project and the computerization of the UW System's property maps will position the University System as an active partner with other units of state government in the sharing of land records information, help to avoid further investment in the UW System's deteriorating and out-of-date property maps, and create the base maps for modern university infrastructure management systems.

This digital base will become the foundation for the University of Wisconsin System's computeraided infrastructure management efforts, using Computer Aided Design and Drafting (CADD) and Computer Aided Facilities Management (CAFM) systems. This is possible because the computerized property maps will not only include the information that is available on the existing paper maps regarding ownership, campus plans, and Regent-approved campus boundaries for each university, but they will also serve as the basis for geographically referencing all of the facilities' management information on a campus, such as underground steam lines, electrical tunnels, building footprints, easements, street relocations, hazardous waste storage sites, emergency response routes, proposed parking lots, and hundreds of other geographically-related facilities.

In cooperation with UW System Administration, several universities have already installed CADD systems, as has the Division of Capital Budget and Architectural/Engineering Services. Several other universities are also in the process of installing such systems. In addition, the division is working with several major corporations to pilot infrastructure management systems utilizing CAFM technologies, all of which will use the land record of a campus as their base map. The Offices of Information Management Services and Planning and Property Management have begun working out common cartographic standards for the sharing of computerized land records with the Departments of Transportation, Natural Resources, and Administration, and will seek additional guidance from the Wisconsin Land Information Board to ensure that computer mapped data is compatible with whatever state standards are established for exchange and sharing of land information.

The University of Wisconsin System, particularly at the Madison branch, has been a leader in the conceptual development of land information management and the use of GIS.

Examples of GIS technologies currently in use include map-based asbestos management systems which tie the locating of asbestos on a campus to databases gathered on the characteristics of the material, inspection data and regulatory compliance documents; and the use of map based systems to locate and track hazardous materials on a campus by building and room for use by local fire departments and emergency response teams linked to databases about recommended emergency procedures and proper hazard protection practices (as well as data on health and safety considerations). Map-based automated systems are also being developed for physical facilities maintenance management, linking locations of infrastructure components requiring maintenance, such as chillers, blowers, and other utilities, to data about maintenance histories, maintenance schedules, work order and personnel repair schedules, equipment inventories and related information. Finally, map-based systems are presently in use for managing the thousands of miles of telecommunications cables running through and connecting university facilities, linking cable locations to other related campus databases.

A wide range of new systems in other areas is being planned and tested, including security, lock and key control systems, energy management applications, videologs and raster scanned databases linked to vector data, infrared imaging for heat loss and power consumption, a real estate management system, use of field data entry devices (such as bar code scanners linked to mapped based input screens), and similar applications of GIS technologies. The UW System is committed to the use of GIS technology in the administration and management of its land and physical facilities and will continue to research, test and develop them in the future.

Documents List

Directives

Act 31, Enabling Legislation for the Wisconsin Land Information Program and Land Information Board, 1989.

This act established Wisconsin's Land Information Program and Land Information Board, which was administratively attached to the Department of Administration. The board's membership includes the secretaries or representatives of the following state agencies: the Department of Administration; the Department of Agriculture, Trade and Consumer Protection; the Department of Natural Resources and Transportation; the State Cartographer; and four representatives each from local governments, and public utilities and private businesses. Advisory members include the state historic preservation officer, the Secretary of Revenue, and the State Geologist, and other representatives of local and regional governments, and federal agencies. The act states that the board's mission was to "direct and supervise the land information program and serve as the state clearinghouse for access to land information," including the provision of "technical assistance and advice to state agencies and local government agencies, and maintain and distribute an inventory of land information."

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The act requires annual reports be submitted each March from major state agencies to include "a plan to integrate land information to enable

such information to be readily translated, retrievable, and geographically referenced for use by any state, local government unit or public utility." The state previously created the State Cartographer's office. This bill directed the State Cartographer, among other things, to work with the board to promote liaison among all levels of government to facilitate coordination and exchange information on mapping and cartographic activities. It also directed that the state's Natural heritage Inventory Program and Wetlands Mapping Program proceed in cooperation with the board. Aid to counties is included, including the opportunity to participate in the program, including creation or designation of a county land information office and submission of a grant request to help modernize land records with an approved plan by the board. A staff position was authorized for one year to provide staff services for the program. The act left some important features of the program open.

Act 339, Establishing Funding for the Wisconsin Land Information Program, 1990.

This act provides for funding for the Wisconsin Land Information Program approved by Act 31, adopted in 1989 (see above). It also changed the focus of the program from purely a grants program to one that provides for locally collected and retained sources of revenue. It provides that the recording fee collected by the county register of deeds' offices be increased for the first page from \$4.00 to \$8.00 effective July 1, 1990, and from \$8.00 to \$10.00 effective July 1, 1991. Of these funds, \$2.00 of the first increase are retained by counties participating in the program, and all of the additional \$2.00 fee increase effective in 1991 is retained by participating counties. This funding was established to sunset on July 1, 1996. State funds are designated to be used by the Wisconsin Land Information Board for grants, technical assistance and systems integration to improve land records administration in the state's counties. The act requires participating counties to establish Land Information Offices, and, to within two years, have a county-wide plan for land records modernization approved by the board. These counties were also required to earmark program revenue exclusively for the development, implementation, and maintenance of the county-wide plan. The act increased staffing authority to the equivalent of 2.5 full-time staff members.

Act 39, Eliminating the Requirement for County Matching Funds for Grants-in-Aid. for the Wisconsin Land Information Program, 1991.

This provision eliminated the matching requirement of counties in order to receive grants-in-aid in the Wisconsin Land Information Program. The legislature did not perceive the match as necessary

because the nature of the program changed by Act 339 from strictly a grants program to one providing funds directly to participating counties.

Executive Order No. 79, Establishing the Wisconsin Land Records Committee, August 7, 1985.

This Executive Order created the Wisconsin Land Records Committee as a 32-member committee with membership represented state and local elected official officials, departmental personnel and appropriate private industries. It charged the committee with examining and addressing the immediate needs of state and local agencies regarding land records collection and management, and to develop recommendations on how Wisconsin should approach the long-term issues of land records modernization.

Reports/Publications

Aid to Counties—Procedures, Standards and Criteria for Grants-In-Aid to Local Government, Holland, William, Wisconsin Land Information Board, June 10, 1991.

This statement addresses the issue of funding the program for the implementation of a grant program for local governments. It provides an overview of the applicable statutes and grants process. The statement describes the grant procedure and evaluation criteria used to evaluate local grants of up to \$100,000.

Preparing the County-Wide Plan for Land Records Modernization—Approaches and Methodologies to Make the County-Wide Plan Successful, Holland, William, Wisconsin Land Information Board, DRAFT, May 23, 1991.

This statement provides a background to the planning process, individual subsections that correspond to the required format of the plan, suggestions and alternative ways to prepare the plan, references for relevant statutes, and the names of persons who may be contacted for questions about specific standards.

Introduction to Local Land Information Systems for Wisconsin's Future, Vonderohe, Alan, P., et.al., University of Wisconsin -Madison, Published by the State Cartographer's Office, April, 1991.

This document focuses on the context and development of automated land information systems from a Wisconsin perspective, and includes a general description of concepts and terms regarding spatial reference systems, geodetic control and the public land survey system. It discusses automation of spatial and textual data, implementation processes and issues, and provides a guide to further information.

Implementation of Land Information Systems in Local Government—Steps Toward Land Records Modernization in Wisconsin, Ventura,

Stephen J., Published by the Wisconsin State Cartographer's Office, April, 1991.

This handbook provides guidelines for gathering information necessary to deal with many of the technical issues that arise i successful LIS implementation. The intended audience is local government staff and officials charged with developing a county-wide land records modernization plan and, more specifically, to those who may be involved with the design, procurement, or management of automated land information systems.

Recommendations and Requirements for County-Wide Plans for Land Records Modernization, Holland, William, Wisconsin Land Information Board, January, 1991.

This document sets out board requirements for local governments in the development of the County-Wide Plan. It was finalized after review and public hearings enabling local officials to have input for the final version.

Wisconsin Statutes Applicable to the Land Information Program, Wisconsin Land Information Board, 1990.

This document describes in detail Act 31 and Act 339 which created and provided funding for the Wisconsin Land Information Program. It includes verbatim provisions of the statutes, including those related to the Wisconsin Land Information Board; Operative Statutes, Definitions, Duties, Funding and Aid to Counties; and specific duties of cooperating state agencies.

Developing the Wisconsin Land Information Board's Recommendations and Requirements for County-Wide Plans, Wisconsin Land Information Board, November, 1990.

This document was prepared for distribution to the counties of Wisconsin, local decision makers, and land records professionals as part of a series of statewide public hearings to elicit suggestions on the proposed Wisconsin Land Information Board document entitled Recommendations and Requirements for County-Wide Plans for Land Records Modernization. This document includes a draft of the draft recommendations and requirements, summarized statutes, and a listing of county office contacts.

Request for Proposals for Geographic and Land Information System Software, RFP #2519, Wisconsin Department of Administration, November 30, 1990.

This request for proposals was issued to provide interested parties with information to enable them to prepare and submit a proposal to provide Geographic Information System/Land Information System (GIS/LIS) software to state and local units of government, their departments and

agencies. This would also include, where appropriate, services, installation, support and hardware. The development of this request for proposals is made to be consistent with the objectives of the Wisconsin Land Information Program.

Basemaps, Cartographic Control, Tile Structure, and Projection/Coordinate Systems Currently Used for GIS Applications by Wisconsin State Agencies at 1:24,000 and Smaller Scales, Wisconsin State Interdepartmental Geographic Data Sharing Workgroup, August 14, 1990.

This inventory documents current conditions and practices among the member agencies of the Wisconsin State Interdepartmental Geographic Data Sharing Workgroup. It is descriptive, and is not a "standard." Its purpose is to promote the sharing of data and to provide general information. Workgroup members and other interested parties will ultimately document their collection in an inventory system maintained by the State Cartographer's Office or some other appropriate agency.

Policy Objectives and Program Implementation in Light of the Enabling Legislation, 1989 Wisconsin Acts 31 and 339, Holland, William, Wisconsin Land Information Board, August, 1990.

This statement is an interpretation of Act 31 and 339 for use by the board to enable it to define its objectives and to guide operation of the Wisconsin Land Information Program. The interpretation is meant to be both literal and contextual in light of legislative and gubernatorial intent.

Land Records Modernization Cost/Benefit Analysis, Wisconsin Land Information Board, January, 1990.

This statement and its Executive Summary review the current status and analyzes costs and benefits of implementing a statewide LIS and land records modernization program, including opportunity cost of investment.

Wisconsin Department of Transportation-Geographic Information System Development Plan—Phase II-Implementation, GIS Steering Committee, September, 1989.

This document, prepared by the Department of Transportation (DOT) GIS Steering Committee, is designed to serve as a blueprint to guide the development of the institutional and human resources necessary for a successful GIS program at the DOT. This document also is meant to serve as a statement of DOT's GIS objectives and provides an outline of the tasks and resources necessary to evolve form the limited, existing GIS prototype applications into a major service initiative of the Hill Farms Regional Computing Center.

Final Report of the Wisconsin Land Records Committee and Subcommittee Reports, Wisconsin Land Records Committee, July 1, 1987.

This report, superseding the committee's Summary Report of October 1986, is the summary and final report prepared by the Wisconsin Land Records Committee (WLRC), which was established by Executive Order in 1985. It features the WLRC's recommendation for the establishment of a Wisconsin Land Information Program, a strategy for statewide land records modernization. Other report topics include why modernization is needed in Wisconsin, the role of multipurpose land information systems, and the committee's overall purpose and accomplishments. The report was supplemented by work and reports prepared by the Committee's Subcommittees, as summarized below.

Basic Issues Group

Report No. 1: Subcommittee on Statutory Data Requirements: Wisconsin Statutes Affecting Land Records, is a well-indexed reference documents that describes over 600 provisions of the Wisconsin Statutes related to land information collection, management, and use. This report was proceeded by the Wisconsin Statutes Affecting Real **Property Records.** Each of the 600 pieces of legislation, is categorized and cross referenced into seven sections by the type of land information to which they relate. This report summarized and cross indexed the key provisions in the statutes affecting land records. The following categories of land information were Land transactions, Property taxation, Natural resource management and planning, Environmental management and planning, Human resources and quality of life management and planning, Permits, licenses, registration, certification, adoption approval and review; and Management of public records and accessibility.

Report No. 2: Subcommittee on Benefits & Costs: Guidelines for Benefit-Cost Analysis of Land Records, offers guidelines for conducting various benefit-cost analyses of land information systems in Wisconsin. This report concluded that no specific recommendation can be made that works in all situations about how to apply benefit-cost analysis to land records. The report's Bibliography of Land Records Cases with Summaries and Abstracts is particularly noteworthy.

Report No. 3: Subcommittee on Data Responsibility, Maintenance & Security: The Final Report of the Subcommittee on Data Responsibility, Maintenance & Security, proposes principles for an orderly transition from the present status of land records management to modern multipurpose land information systems, as well as a process by

which to implement these principles. It categorizes land records information based on use, establishes land record principles and outlines a land records modernization process with certain goals. The report provides a categorization of land records information including Individual property rights, property valuation, natural resources, infrastructure, geographic references, socio-economic and land use. It includes a usage matrix to identify each land record and the agencies that collect and use the data. The report includes principles for land records to promote uniformity for identifying and recording each parcel of land in the state. It further includes goals and recommendations for a land records modernization process.

Report No. 4: Subcommittee on Property Records: The Final Report of the Subcommittee on Property Records, proposes that certain property records are essential for basic land information systems, and assigns priorities to other records for inclusion in more extensive systems. Also included are lists of land records users and providers.

Information Issues Group

Report No. 5: Subcommittee on Classification & Standards: The Overall Recommendation of the Report on Land Records Classification and Standards, recommends is that a land data file descriptor be established to facilitate interaction among land information users. The file descriptor would include several standardized items such as general subject titles and uniform geographic codes.

Report No. 6: Subcommittee on Interagency & Intergovernmental Data Processing ('Networking'): The Final Report of the Subcommittee on Interagency and Intergovernmental Data Processing, features a conceptual model for an interagency/intergovernmental land information network. It also discusses "networking" needs from various land information user perspectives.

Report No. 7: Subcommittee on Geographic Reference Standards: A Recommended Geometric Framework for Land Data Systems, describes Wisconsin's current geographic reference system and recommends the development of a geometric reference framework with certain accuracy requirements. The report also recommends procedures for updating land information and resolving existing discrepancies that will be uncovered as land databases develop.

Report No. 8: Subcommittee on Emerging Technologies, Modern Technology for Land Records Information Systems, identifies problems inherent in existing automated land information systems, and offers guidelines to local government for procuring automated systems. A significant portion of the report discusses techniques for data

collection, conversion of data into various formats, and base mapping.

Management Issues Group

Report No. 9: Subcommittee on Capitalization & Financing of Data Systems: Final Report of the Subcommittee on Capitalization and Financing of Data Systems, is in two parts: (1) a brief paper on funding sources for the proposed Wisconsin Land Information Program; and (2) an update of Planning for the Collection of Natural and Physical Resources in Wisconsin, a 1981 Department of Administration study to determine state agency expenditures on the collection of resource data.

Report No. 10: Subcommittee on Institutional Arrangements: Institutional Arrangement for Land Information Management in Wisconsin, presents several alternatives for organization mechanisms by which institutions can approach land records modernization. The alternatives are reviewed using overlapping economic, political, and technical criteria. A single, combined alternative is recommended which helped shape the Wisconsin Land Records Committee's final recommendations, including establishment of a Land Information Systems Board and an Office of Land Information to develop a LIS, administer grants and create a network of data bases. It also proposed the creation of a professional association, the Wisconsin Land Information Association to advise the Board and Office, and serve as an advocacy group. Local groups were also proposed.

Report No. 11: Subcommittee on Cooperative Arrangements, Final Report of the Subcommittee on Cooperative Arrangements, examines existing cooperative arrangements to determine which are successful, and why. It also determines the types of cooperative arrangements Wisconsin would benefit from the most and recommends general steps toward development of cooperative arrangements. This report identified some of the key elements of the ideal cooperative arrangement including reliable data, incentives for participation, clear cut custodial responsibilities, standards for data, hardware and software; well defined decision-making process, fiscal responsibility and financial commitment defined, and an arbitration mechanism to settle disputes. Drawbacks to cooperative arrangements were discussed, including liability for secondary use of data, legal restrictions against sharing information, and turf wars over information ownership. A case study of a pilot project attempted by the Southeast Wisconsin Consortium was discussed. Here the local governments and utilities discussed the potential for a shared digital landbase, but so many problems were encountered that it was scuttled.

Report No. 12: Subcommittee on developing Model Requests for Proposals (RFP's), Final Report of the Subcommittee on RFP's, offers general guidelines for preparing requests for proposals (RFP's) to procure technological and other products and services for land records management. The guidelines are intended to be of use to local governments in particular. This report examined the complexity of procurement for these unique systems. It recommended the formation of a special office to serve as a clearinghouse for model RFPs and to monitor the RFP situation on an ongoing basis. It also recognized the need for qualified assistance in RFP preparation and suggested Federal and State agencies and universities as sources of help.

Task Force on Local Institutional Arrangements
Report No. 13: Task Force on Local Institutional Arrangements: Local Institutional Arrangements for Land Information Management in Wisconsin, closely examines a variety of organizational factors that will affect local governments, small businesses, and small utilities planning to modernize land records. Included are case studies summarizing the organizational aspects of several notable Wisconsin land records systems. Also provided is a list of current land records modernization efforts throughout Wisconsin, including who to contact for further information. This was the final report of the committee.

Land Records—The Cost to the Citizen to Maintain the Present Land Information Base, a Case Study of Wisconsin, Larsen, Barbara, et. al., January, 1978.

Also known as *The Larsen Report*, this document describes the costs to the citizens of Wisconsin to collect and maintain land records for the state during FY 1975-76 for all federal, state, regional, and local governmental units which are responsible for producing, collecting, and maintaining records about the land. Definitions are provided.

Papers

Land Information Systems Modernization in Wisconsin: Government-University-Professional Interactions, by Bernard J. Niemann, Jr., Robert W. Merideth, Jr., D. David Moyer and James L. Clapp, *Government Information Quarterly*, Vol. 7, No. 3, pp. 269-283, Fall, 1990.

This article discusses Wisconsin's evolution and process to modernize land information including participation of by representatives of government,

the private sector, academia, and professional organizations. It includes an historical review of events and conditions over 20 years leading to the Wisconsin Land Information Program established by statute in 1989, including coordinating groups and demonstration projects.

The Wisconsin Land Information Association: A Professional Organization for State-Wide GIS Coordination, Miller, Allan H., *Urban and Regional Information Systems Association Journal*, Vol. 2, No. 1, pp. 54-57, Spring, 1990.

This paper provides information in the way of background, task, and overall goals of the Wisconsin Land Information Association as they relate to statewide geographic information coordination.

The Wisconsin Land Records Committee: Its Background, Status, Impact and Future, by Clapp, James L., D. David Moyer, Bernard J. Niemann, Jr. or the Center for Land Information Studies Institute for Environmental Studies, University of Wisconsin-Madison, November, 1988.

This paper reviews the status of the statewide land records modernization program in Wisconsin.

The Wisconsin Land Records Committee and its Approach to Land Records Modernization in Wisconsin, Merideth, Robert W., Jr., Bernard J. Niemann, Jr., D. David Moyer, James L. Clapp or the Center for Land Information Studies, Institute for Environmental Studies, University of Wisconsin -Madison, August, 1986.

This paper describes the activities of the Wisconsin Land Records Committee (WLRC), established in August 1985 by Executive Order to examine the immediate and long-term issues of land records modernization in Wisconsin. WLRC was composed of citizens and professionals from all levels of government, business, and academia and is studying the economic, social, political, and technical issues associated with land records modernization.

Newsletters

Wisconsin Mapping Bulletin, State Cartographer's Office, Bob Gurda, Editor. Published bi-monthly.

Wisconsin Land Information Newsletter, University of Wisconsin -Madison, Bernard J. Niemann, Jr., Editor. Published approximately three times per year.

Wisconsin Air, Land and Water Resource Information Service (WALWRIS) Tassar, Paul, Editor. Published quarterly.

Document Excerpts

Recommendations and Requirements for County-wide Plans for Land Records Modernization, Wisconsin Land Information Board, January, 1991.

(Excerpts describing the contents of County-wide Plans for Land Records Modernization):

1. Foundational Elements. Program success, both from a state and local perspective, is dependent upon a focus for Program activities. In addition, public benefits will accrue earlier once all participating counties have achieved a standard or minimum level of modernization. As a result, the Board has placed the highest priority on each of the following land records modernization elements. In order for a Plan to be approved by the Board, it must address each of the Foundational Elements that follow.

Each of the Foundational Elements must be fit within the planning horizon of the County-Wide Plan. Again, the minimum planning horizon is five years. Recognizing that the circumstances, resources and priorities of each County differ, the length of the planning horizon may be determined by the participants to the Plan based on their own preferences, resources and needs for modernization projects over time. For example, the County may elect to undertake one or more of the Foundational Elements in the first few years of its Plan and defer other Elements until later years.

- a. Geographic Frameworks. These frameworks include Public Land Survey Monumentation and Coordinate and Elevation Determination.
 - b. Parcels.
 - c. Wetlands Mapping.
 - d. Soils Mapping.
 - e. Zoning Mapping.
 - f. Institutional Arrangements.
 - g. Communications, Education and Training.
 - h. Public Access Arrangements.

Additional activities and programs may be included in each Plan. An activity that is proposed to be undertaken in the Plan must be accompanied by a description of its relationship to the Foundational Elements. For each of the Foundational Elements and Additional Potential Activities that may be pursued, the Plan must also address the following:

- a. A description of activity or program, including the source and nature of automated land information.
- b. Relationship of the activity or program to other modernization activities or programs.
- c. Status of the activity or program, including status to date and estimated completion date.
- d. The anticipated benefits of any programs or projects
- 2. Standards. Associated with each Foundational Element is a set of Standards. Because there are many methods used across the range of Land Information Activities, it is crucial that standardized methods of evaluating and exchanging this information be adopted. This is to ensure that information that is shared can be relied on by others with respect to data accuracy and understanding. This list of Standards represents a minimum set of qualifying criterion, not a broad enumeration of all possible standards. These Standards must be observed in both the Plan and its implementation as a condition of the County's participation in the Program. Depending on the type, purpose and use of the infor-

mation, these Standards may be superseded by other standards established by statute.

- a. Geographic Frameworks. Two of the principles of land records modernization are that these systems are focused on information and that spatial data must be related to geographic locations. Therefore, every land records modernization program must have a plan for collecting and organizing base geographic information. There are three primary categories of base geographic information which must be addressed. This collection of base geographic data may be called a Base Map.
- 1. Geodetic Reference Systems. All geographic coordinates must be based on legislatively established datums or related to legislatively established datums through Federal Geodetic Control Committee approved mathematical or statistical procedures. Chapter 236.18 defines the current Wisconsin coordinate system and datum.
- 2. Public Land Survey System Corners. There are two activities for Public Land Survey System corners which are related to Geographic Frameworks, remonumentation and coordinate values. These two activities should be considered together. No remonumentation activities may be undertaken without establishing coordinate values on the resulting monument. Conversely, activities to establish coordinate values on existing monuments must include filing a monument record.
- a. Public Land Survey System corner remonumentation is guided by Sec. 59.63 (1) and 60.84 (3) (c) Stats. The records of remonumentation are guided by Sec. 59.635 (b) Stats. and Wis. Adm. Code, AE 7.08 (2).
- b. Coordinate values established on section and quarter section corners must meet or exceed Federal Geodetic Control Committee Third Order Class I standards.
- 3. Geographic Control Data. To support the mapping and management of other foundational elements, control data coordinate and elevation values must meet or exceed Federal Geodetic Control Committee Third Order, Class II standards. All other man made and natural resource features such as traveled ways, shoreline, river banks, fence lines, buildings, and improvements shall meet National Map Accuracy Standards. This base geographic data can be collected from maps, aerial photos, and other media to establish coordinates and elevations on these features.
- b. Parcels. Parcels are areas of land which can be described by boundaries or lines forming closed geometric features or polygons. Parcels are generated for many purposes including property taxation, determination of interests of ownership in land, zoning regulation, and land use. There are four distinct categories of data related to parcels.
- 1. The first category is Cadastral or Legal Evidence. These data are the legal building blocks of the spatial representation of land ownership. Examples are remonumentation records and measurements, deed and plat measurements, and other survey information.
- The second category is Parcel Boundaries. A collection of parcel boundaries forms a parcel. There are two types of procedures to produce parcel boundaries.
- a. The first type of parcel boundary is collected from legal records and geographic base data. Each boundary is referenced to its source document. It is possible for parcels formed from this type of boundary description to have significant overlaps and gaps with neighboring parcels. The gaps and overlaps of neighboring parcels shall be shown or disclosed with this type of parcel boundary collection. Resolution of single parcel mid-closures and gaps and overlaps of neighboring parcels is encouraged through whatever means are available including assessor plats.
- b. The second type of parcel boundaries are collected from generalized representations of boundaries, shapes, and lo-

cations. This type of boundary collection represents a wide range of precision and resolutions.

- 3. The third category is Parcel Administration. Examples of parcel administration include, topological data structures, attaching evidence of title to areas of land, zoning classification, attaching property tax and assessment files to areas of land, and other administrative details. The type of parcels administered, how their boundaries are collected, and what they can and cannot be used for shall be clearly stated. Parcels may include information related to registers of deeds records such as tract indexing systems that meet or exceed the requirements set forth in Sec. 59.55 Stats.
- 4. The fourth category is Parcel Identification. For both internal and external uses, each parcel of land shall have a unique parcel identification number assigned to it. Automated maps in land records modernization make it possible to easily identify where parcels are in relationship to Public Land Survey System township, range, section, quarter section, and sixteenth section. All parcel identification schemes must relate, at the minimum, to the quarter section of the Public Land Survey System. The functionality of sixteenth section identification is optional and may be met with a geo-code parcel identifier or by relationship to tables of geo-code attributes.
- c. Wetlands Mapping. County Wetland Maps shall be based on the statutorily defined Department of Natural Resources Wetlands Map, pursuant to Sec. 23.32, Wis. Stats.
- d. Soils Mapping. Modern County Soil Surveys shall be based upon, compatible with and accurate to the level of the U.S. Soil Conservation Service Maps.
- e. **Zoning Mapping**. Zoning Maps of the County shall reflect a compilation of the existing local governmental zoning on a county-wide basis.
- f. Institutional Arrangements. The Plan must describe all Institutional Arrangements the County has entered into and plans to enter into in the development, implementation and maintenance of the County-Wide Plan. This description should include a listing of all actual and potential participants in the planning process. In addition, the nature of the relationships and responsibilities shall be disclosed. This should include both formal and informal agreements. In describing these relationships, it will be adequate to simply attach a copy of any agreements that have been entered into as an attachment to the Plan.
- g. Communications, Education and Training. The Plan shall describe, in as much detail as is appropriate, the County's strategy for communication, education and training concerning the County's land information system.
- h. Public Access Arrangements. The Plan shall describe, in as much detail as is appropriate, the County's strategy for providing public and private access to the various records as they are modernized. This should include discussion of system security and preservation of an individual's right to privacy.
- 3. Data Interchange Standards. The standards enumerated above for the Foundational Elements are "Content Driven" standards. Data Interchange Standards fall into two categories, informal standards and formal standards.
- a. Informal Data Interchange Standards. Informal exchange standards are simply those methods and formats for exchange that can be agreed upon between two or more entities that are sharing data. Informal standards are relatively uncomplicated. For the present time, informal standards serve as the primary means by which data integration and sharing will occur.
- b. Formal Data Interchange Standards. Formal exchange standards may be based on the Spatial Data Transfer Specifications that are presently in development by the U.S. Geological Survey. These standards will be considered and evaluated by the Board, in one form or another, as they

become available.

- c. Parcel Identification Numbers. The Board has adopted one set of Data Interchange Standards with respect to unique parcel identification numbering systems. For both internal and external uses, each parcel of land shall have a unique parcel identification number assigned to it. This numbering system is divided into three distinct components. The components that have mandatory formats are identified in Part I and Part II respectively and are explained below. The optionally formatted components are described in Part III. When parcel information is formally shared, parcel numbers shall be in the following field format which is composed of 13 numbers and characters that are in a mandatory format and 5 optionally formatted numbers and characters. All components are mandatory.
- **PART I.** Part I codes identify both the county and minor civil division in which the parcel lies. These codes may be associated or related to the parcel in several ways. For example, the codes may appear as part of other relational tables, at the top of headers to ranges of parcel numbers, as prefixes or suffixes to parcel identifiers, or as geo-processing relationships using geographic information system software.
- 2 Digits. The first two digits are the County Code as defined by the 1990 Wisconsin Department of Revenue *Property Assessment Manual*.
- 3 Digits. The next three digits are the Municipal Code as defined by the 1990 Wisconsin Department of Revenue *Property Assessment Manual*.
- **PART II**. Part II is a parcel location identification system that utilizes the Public Land Survey System to ascertain the position of the parcel within a specific Quarter Section. Some areas of the State are not part of the Public Land Survey System. For those parcels not covered by the Public Land Survey System, the Board will provide specific codes at a later date to define Part II parcel location identifiers.
- 1 Digit. The next digit defines whether the parcel lies east or west of the 4th Principal Meridian. Those parcels that lie east of the 4th Principal Meridian are denoted by the number 4. Those that lie west of the 4th Principal Meridian are denoted by the number 2. Those parcels not covered by the Public Land Survey System may be denoted by the number 0.
- 2 Digits. The next two digits define the Township north of the baseline. For parcels not covered by the Public Land Survey System, the content of these two digits identifying the Township may be alphanumeric to indicate the lack of coverage by the Public Land Survey System. These alphanumeric codes will be provided by the Board upon request at a later date.
- 2 Digits. The next two digits define the Range. For parcels not covered by the Public Land Survey System, the content of these two digits identifying the Range may be alphanumeric to indicate the lack of coverage by the Public Land Survey System. These alphanumeric codes will be provided by the Board upon request at a later date.
 - 2 Digits. The next two digits define the Section.
- 1 Digit. The final digit defines the Quarter Section by Northeast = 1, Northwest = 2, Southwest = 3, and Southeast = 4. If the Quarter Section is unknown or otherwise unavailable, it shall be denoted by the number 0.
- **PART III.** An optional format for specific parcel identification is as follows:
- 1 Digit. The first optional digit defines the Quarter-Quarter Section by Northeast = 1, Northwest = 2, Southwest = 3, and Southeast = 4. If the Quarter-Quarter Section is unknown or otherwise unavailable, it shall be denoted by the number 0.
- 3 or 4 Digits. The final three or four optional digits may be used to define a specific parcel identifier within this par-

cel identification numbering system. Whether three or four digits are used is also optional. If these optional numbers are used, the Quarter-Quarter Section code must also be used to maintain a standard format.

All delimiters, e.g., commas, dashes and spaces, must be removed before information is shared. It should be noted that this standard does not affect existing, internal parcel identification systems. This standard does not govern any informal data sharing agreements. Instead, this standard refers, at a minimum, to the employment of the above field format in formal data exchange settings. See Appendix B for further explanation and an example of this numbering system.

- 4. Administrative Standards. The County-Wide Plan represents an agreement between the County and the Wisconsin Land Information Board. This agreement is intended to effectuate the objectives of the Program as embodied in the enabling legislation. In order for a County's Plan to be approved, the Board and the County agree and consent as follows:
- a. The County agrees to observe and follow the statutes relating to the Wisconsin Land Information Program and other relevant statutes.
- b. The County agrees to permit the Wisconsin Land Information Board access to books, records and projects for inspection and audit upon reasonable notice by the Board.
- c. The County agrees to provide an annual status report of Plan progress and to update the Plan at the end of five years.

- d. The Board agrees to provide technical assistance to the County.
- e. The Board agrees to maintain and distribute an inventory of land information and land information systems for the state.
- f. The Board agrees to review and, where appropriate, approve Plans and to provide guidance to counties with respect to Plan development. In addition, the Board agrees to review and, where appropriate, approve updates and revisions to County-Wide Plans.
- g. Board approval of a County-Wide Plan confers certain benefits on local government within the County, including continued participation in the Program and eligibility to make application for Grants-In-Aid.
- h. The Board agrees to review Grants-In-Aid project applications and to provide guidance to counties with respect to the development of such applications.
- i. The Board agrees to provide participating counties with an annual report regarding the status of the Wisconsin Land Information Program and the activities of the Board.
- j. A County will be entitled to retain increased recording fees upon designation of a Land Information Office provided that within two years of the designation it submits a County-Wide Plan to the Board which is approved. Board approval of the County-Wide Plan also enables the County to apply for Grants-In-Aid for itself or any other local unit of government within its borders.